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The Future of Oasis Ecosystems

Executive Summary

The United Nations Food Systems Summit in 2021 has called for food systems transformation and climate resilience in a manner that safeguards ecosystems and “leaves no one behind”. Oases are unique ecosystems that host some of the most vulnerable populations, with a significant proportion of smallholder farmers and pastoralists.

Oases are important zones that provide ecological, economic, social and cultural services in most dryland ecosystems of the globe while providing a natural barrier to desertification in arid zones. Drylands are home to three billion dwellers and 48 percent of the surface of the globe. They are an expression of ingenious human adaptation to the harsh conditions of their environment, through know-how, indigenous knowledge, integration of adapted animals and plants with appropriate social innovations.

Climate change with its recurrent droughts and extreme events, in addition to demographic evolution and migration, especially of youth, has the potential to undermine the foundations of resilience gained over centuries in oasis populations and their ecosystems. As oases are characterized by scarcity of resources, they have brought about a way of life governed by the principles of conservation, savings, and rationalization. Indeed, the management of scarce water and land has given rise to ingenious, rational and even equitable sharing systems.

Natural resource challenges can amplify fragility risks particularly when policy design and implementation do not adequately promote sustainability, inclusion and resilience.

The Suggested action by the Regional Conference

The Regional Conference is invited to:

- a. recognize the importance of the oasis ecosystems as models of resilience and adaptation, serving as demonstration sites for adaptation-related innovations.
- b. invite all stakeholders to invest in all aspects of oasis preservation to avoid the disappearance of a thousand-year-old heritage.
- c. advocate for the inclusion of oasis systems in funding mechanisms, in particular those linked to the three Rio conventions, namely the Convention on Biological Diversity (CBD), the

Documents can be consulted at www.fao.org

United Nations Convention to Combat Desertification (UNCCD) and the UN Framework Convention on Climate Change (UNFCCC).

To achieve the above objectives, a Center of Excellence is being created in the FAO Subregional Office for North Africa (SNE) to foster the resilience of oasis ecosystems through South–South and Triangular Cooperation, resource mobilization, and sharing and exchange of innovation, knowledge and know-how.

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I. Introduction

1. Oases and oasis systems cover around 30 percent of the arid lands between the Sahara in Africa and Mongolia in Asia and support around 150 million people.¹ These communities play a role as guardians of Indigenous culture and thousands of years of knowledge about these systems. Oases are a major part of dryland ecosystems, which supply 60 percent of global food production.²

2. Climatic and geomorphological attributes determine the fundamental distinctions between the types of oases. Oases are human-crafted cultivated havens nestled within vast arid or desert areas. Characterized as “vegetation isles” around a water source in the desert, these ecosystems embody development undertaken over centuries by local communities.

3. Both hot and cold regions host oasis ecosystems. The hot oases include the ones in the Saharan Desert and the Arabian Desert. The cold oases are those of the Asian deserts to the North and East of the Himalayan chain. Oases epitomize arid and desert zones. For example, in China, although oases occupy only 5 percent of the total surface area of the arid and semi-arid zones, they are home to 90 percent of the population and 95 percent of the social wealth of arid and semi-arid zones.³ In North Africa, oases are home to approximately 15 million people.

4. Sustainable management of oasis ecosystems supports the recommendations of the Intergovernmental Panel on Climate Change (IPCC) *Special Report on Climate Change and Land*, which stresses that “addressing desertification, land degradation, and food security in an integrated, coordinated and coherent manner can assist climate resilient development and provides numerous potential co-benefits”.⁴

5. The concepts of ecosystem and cultural landscape consider oases as an ingenious human creation and an extraordinary model of harmonious relationship between man, culture, land and the environment. A better understanding of the challenges and opportunities in oasis can be achieved through transdisciplinary, multi-scale and cross-sectoral approaches which encompass the links between physical, biological, socio-economic and institutional systems.

6. By preventing, halting, restoring and reversing degradation in oases, contributions will be made to achieving numerous Sustainable Development Goals (SDGs) such as SDG 1 on poverty, SDG 2 on food security, SDG 6 on water and sanitation, SDG 13 on climate change and SDG 15 on halting land degradation and biodiversity loss.

7. Greater attention and advocacy for addressing the challenges and potential contributions of oasis ecosystems is aligned with FAO’s Regional Priority 3: Greening Agriculture. It also aligns with the [decision](#) of the 43rd Session of the FAO Conference to designate the upcoming Biennial Theme (2024-25) to focus on “Water resources management for the four betters: better production, better nutrition, better environment and better life, to achieve Agenda 2030 and the Sustainable Development Goals”.

II. Challenges and constraints of oasis development

8. Drylands cover about 48 percent of the world’s land area and are home to 25 percent of the global population. They contain 50 percent of the world’s livestock and 27 percent of the world’s forests. Drylands are home to rich and unique biodiversity and provide important ecosystem services. Thirty percent of the world’s soil organic carbon is stored in drylands.⁵

¹ <https://geographical.co.uk/culture/life-in-the-desert>

² FAO, 2016. *Trees, forests and land use in drylands*. Available online: <https://www.fao.org/documents/card/en/c/01382d82-6356-478e-9f42-d85ccdfd7a7d/>

³ https://www.researchgate.net/publication/223230813_Oasis_land-use_dynamics_and_its_influence_on_the_oasis_environment_in_Xinjiang_China

⁴ IPCC, 2019. *Climate Change and Land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*. Available online: <https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/>

⁵ FAO, 2016. *Trees, forests and land use in drylands*. Available online: <https://www.fao.org/documents/card/en/c/01382d82-6356-478e-9f42-d85ccdfd7a7d/>

9. For centuries or even millennia, and thanks in large part to oases, many communities in dryland areas have been able to adapt to climatic change relying largely on local resources. The populations of such zones have rich cultural and historical heritage.

10. Addressing oasis challenges aligns with the objectives of the three Rio Conventions: the Convention on Biological Diversity, the United Nations Convention to Combat Desertification, and the United Nations Framework Convention on Climate Change. Actions towards the sustainability of oasis ecosystems also contribute to the Ramsar Convention. These actions will also contribute to the UN Decade on Ecosystem Restoration (2021-2030), which is at the heart of the 2030 Agenda for Sustainable Development, as well as the new FAO Strategic Framework 2022--31.

11. Challenges include rapid population growth in the region and sustained degradation of the natural resource base which have put constraints on the economic development of the region.

12. In addition, rural populations are increasingly challenged by climate change, resulting in increased seasonal migration and increasing urbanization (with further dependence on remittances to rural populations). Inadequate income and poverty of the rural population hamper private small-scale family-based investment into livelihood diversification at the local level. A growing lack of skills and capacities further paralyse the economic development of oases.

13. The multi-functionality of oasis agro-ecosystems remains largely untapped; landscapes and agricultural products are not valued, and key economic sectors – mainly its food industries, tourism and handicrafts – are underdeveloped. Skills development, and new and additional investments are needed in order to turn the tide, attract investments and promote new profit-making activities.

14. Oases have historically played an important role as trade and commerce centres. Their potential for becoming centres for tourism and ecotourism, which can contribute to food security and sources of income and employment, have not been fully tapped yet.

15. The main challenges and constraint areas in oasis development include:

- a. the arid environment and fragility of natural resources, biodiversity loss, depletion of water resources, soil degradation and new pests and diseases;
- b. lack of relevant and good governance of natural resources and development;
- c. loss and deterioration of important heritage, including local knowledge, which are threatened by demography increase, migration, lack of conservation, degradation, desertification and extreme climate and conflict events;
- d. weak or lack of legal and regulatory legislations and policies, particularly in relation to the management of natural resources, land tenure, water and soil management, forest and rangelands management, and management of extractive resources;
- e. lack of territorial approaches, including local empowerment and decentralization;
- f. lack of appropriate models of development adapted to oasis ecosystems and regions, in particular, investments, human capacity, and technical and social innovations; and
- g. lack of financing mechanisms for oasis ecosystems and zones development/projects.

16. The impact of these challenges and constraints is clearly reflected in high risks of desertification, depletion/degradation of water and soil resources, and loss of fauna and flora biodiversity, and consequent food insecurity, low income, migration and loss of precious heritage, including non-material culture.

III. FAO Regional priorities and actions

17. The Globally Important Agricultural Heritage Systems (GIAHS) programme is created by FAO to contribute to the preservation of the most vital and fragile agricultural and food systems through important human traditions that prioritize sustainability and life. Seven oases were recognized as GIAHS, including Ghout Oasis system El Oued in Algeria; Siwa Oasis in Egypt; Oases System in Atlas Mountains, argan-based agro-sylvo-pastoral system in Ait Souab-Ait Mansour, and the ksour of Figuig

in Morocco; Gafsa Oases in Tunisia; and Al Ain and Liwa Historical Date Palm Oases in the United Arab Emirates.

18. Two Global Environment Facility (GEF)-funded projects provide funds for oases-related action in collaboration with the Governments of the North African countries involved. The projects are: i) adaptive management and monitoring of oasis systems in the Maghreb (Mauritania, Morocco and Tunisia); and ii) revitalization of oasis agro-ecosystems through a sustainable, integrated and landscape approach in the Draâ-Tafilalet Region (OASIL) in Morocco.

19. The observance of an International Year of Date Palm by the international community for 2027 would contribute significantly to raising awareness of the viability of the sustainable cultivation of date palm under adverse climatic conditions, while directing policy attention to improving value chain efficiencies.

20. FAO is in the process of establishing a Regional Center of Excellence on Oases that will be hosted at the FAO Subregional Office for North Africa. The mission of this centre will include: i) enabling information and knowledge sharing on oases; ii) providing strategic orientation for the sustainable development of oases through facilitation of think-tanks and fora; iii) raising awareness about the need to safeguard the traditional heritage of oases; and iv) assisting countries to mobilize resources and prepare bankable projects.